

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

T-1 EXAMINATION, Feb 2018

B.Tech II Semester (ECE, CSE, IT)

COURSE NAME: DISCRETE MATHEMATICS

MAX.MARKS:15

COURSE CODE: 10B11MA211

MAX.TIME: 1 Hr

COURSE CREDITS: 4

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**Note: All questions are compulsory. Carrying of mobile phones during examination will be treated as a case of unfair means. Each question carry equal marks.**

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1. Prove in general  $A - (B \cap C) = (A - B) \cup (A - C)$ .
2. Using Mathematical Induction show that  $1 + 2 + 2^2 + \dots + 2^n = 2^{n+1} - 1, \forall n \in \mathbb{Z}^+$ .
3. Find the Reflexive closure, Symmetric closure and Transitive closure of the relation  $R = \{(1,2), (2,3), (3,1), (4,4)\}$  on  $A = \{1,2,3,4\}$ .
4. Show that the equivalence classes  $[4], [5], [6]$  of the relation ' $a \equiv b \pmod{3}$ ' on the set of integers  $\mathbb{Z}$ , forms a partition of  $\mathbb{Z}$ .
5. Use generating function to solve  $a_n - 5a_{n-1} + 6a_{n-2} = 2^n + n, n \geq 2$  with  $a_0 = a_1 = 1$ .

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